

REMARKS

Claims 1-8, 19, 20, 31, 34 and 37-44 are pending in the present application. Claim 41 has been amended and claims 9-18, 21-30, 32, 33, 35 and 36 have been canceled by a previous amendment. Claims 1, 19, 20, 39 and 41 are independent. Reconsideration of this application, as amended, is respectfully requested.

Reasons for Entry of Amendments

It is respectfully requested that the present amendments be entered into the official file in view of the fact that the amendments to the claims automatically place the application into condition for allowance. In the alternative, if the Examiner does not believe that the application is in condition for allowance, it is respectfully requested that the Examiner enter the amendments for the purposes of appeal. The amendments to the claims simplify the issues on appeal by further defining the present invention over the references relied on by the Examiner.

In the present instance, the amendments have been presented to address the specification and claim objections of the Examiner. No new issues have been raised by these amendments, and therefore, the amendments should be entered.

Objection to the Specification

The Specification stands objected to due to amendments submitted in the Amendment dated February 20, 2007. As the Examiner will note, Applicants have amended the Abstract of the Disclosure to remove the recitation "prior to hardening of the screen printed viscous medium" as suggested by the Examiner. Therefore, the specification objection has been obviated.

Claim Objection

Claim 41 stands objected to for a minor informality. As the Examiner will note, claim 41 has been amended to change “viscous medium” to “solder paste” as suggested by the Examiner. Therefore, the claim objection has been obviated.

Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1, 8, 19, 20, 31, 34, 39 and 43 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Todd et al., U.S. Patent No. 5,639,010. Claims 1-8, 19, 20, 31, 34 and 37-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cutting et al., U.S. Patent No. 5,638,597 in view of Osamu, JP 2-200376. These rejections are respectfully traversed.

The present invention is directed to a method of applying viscous medium on a substrate. Each of independent claims 1, 19, 20, 39 and 41 recite a combination of elements including the recitation “wherein the add-on jetting is non-contact dispensing and the add-on jetting viscous medium is still in viscous form during the add-on jetting” or “wherein the jetting of additional viscous medium is non-contact dispensing and the additional viscous medium is still in viscous form during the jetting of additional viscous medium.” Claim 41 specifically recites that the add-on jetting viscous medium is solder paste.

In addition, independent claim 1 recites “add-on jetting of predetermined additional amounts of viscous medium on predetermined positions on the screen printed substrate,” claim 39 recites “add-on jetting of individual droplets of viscous medium on predetermined positions on the screen printed substrate” and claim 41 recites add-on jetting of solder paste on predetermined positions on the screen printed substrate.”

Applicants respectfully submit that the references relied on by the Examiner fail to teach or suggest the present invention as recited in the independent claims.

DECLARATION UNDER 37 C.F.R. § 1.132

A Declaration under 37 C.F.R. § 1.132 has been provided for the Examiner's consideration. The Declaration is from one of the inventors of the present application. It is respectfully requested that the Examiner consider this Declaration, as it is in direct contradistinction to the Examiner's position that the Todd et al. and Osamu references disclose "non-contact" dispensing as recited in the independent claims of the present invention.

THE "NON-CONTACT DISPENSING" RECITATION:

Todd et al.

With regard to the Examiner's reliance on the Todd et al. reference, it is the Examiner's position that Todd et al. discloses non-contact dispensing. Specifically, the Examiner relies on column 3, lines 13-17 of Todd et al. as disclosing non-contact dispensing. Column 3, lines 13-17 state:

In step 34, an adhesive is dispensed on the circuit board in the areas where a surface mount device will later be affixed. Typically a drop of adhesive is dispensed via automated equipment between two solder pads on the circuit board. (emphasis added).

Applicants respectfully submit that there is nothing in the above paragraph of Todd et al. that teaches "non-contact dispensing" as in the presently claimed invention. The above paragraph of Todd et al. merely discloses that adhesive is dispensed via automatic equipment.

In the Examiner's Advisory Action, the Examiner states:

... The Examiner disagrees because Todd et al. disclose a drop, 'the quantity of fluid that falls in one spherical mass' (see Marriam- Webster dictionary [sic]) of the adhesive is dispensed via automated equipment as described in Col. 3, lines 13-17 that means the adhesive is dropped, 'non-contact dispensed' on the substrate.

As explained in the attached Declaration, one having ordinary skill in the art would interpret "dispensing" as "contact" dispensing. It is unreasonable to consider Todd et al. to disclose "non-contact" dispensing, just because the word "drop" is used. Specifically, as mentioned in the Declaration, the word "drop" is used in the SMT literature to describe an amount of liquid "contact" dispensed on a substrate. Therefore, the Examiner's position is without basis.

In addition, there is nothing in the remainder of the Todd et al. reference that teaches "non-contact dispensing" as in the presently claimed invention. There are many types of adhesive dispensers that are contact dispensing and there is nothing in the Todd et al. reference to suggest that the adhesive dispenser is a non-contact dispenser. In view of this, the Todd et al. reference fails to enable the presently claimed invention and therefore, cannot anticipate the presently claimed invention.

To the extent the Examiner believes that Todd et al. inherently discloses non-contact dispensing, the Examiner is reminded that a theory of inherency must be supported by facts and/or technical reasoning that reasonably support a determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *Ex parte Levy* 17 USPQ2d 1461 (BPAI 1990) (emphasis added). The Examiner has attempted to provide such reasoning;

however, the above comments and the attached Declaration clearly rebut the reasoning of the Examiner.

In view of the above,, since Todd et al. fails to disclose “non-contact” dispensing, Todd et al. fails to teach each and every recitation in independent claims 1, 19, 20 and 39 of the present invention, Applicants respectfully submit that Todd et al. fails to anticipate these independent claims of the present invention for at least this reason. In addition, Todd et al. fails to anticipate dependent claims 8, 31, 34 and 43 at least due to the dependence of these claims on independent claim 1, which is believed to be allowable. Therefore, the Examiner’s rejection of claims 1, 8, 19, 20, 31, 34, 39 and 43 should be withdrawn.

Cutting et al.

With regard to the Examiner’s reliance on Cutting et al., the Examiner acknowledges that Cutting et al. fails to disclose non-contact dispensing as in the presently claimed invention. However, the Examiner relies on Osamu to modify the device of Cutting et al. to include the solder dispenser 12 of Osamu. Applicants respectfully submit that Osamu also fails to disclose “non-contact dispensing” as in the presently claimed invention. Therefore, Osamu fails to make up for the deficiencies of Osamu.

The Examiner relies on Figure 1 and the Constitution of the Abstract of Osamu, which states:

CONSTITUTION: The information indicating the points and kinds of the solder defects is applied from an automatic solder inspecting device 3 to the control section 9. A solder removing section 5 consists of a solder sucking machine 10 and a controller 11 thereof and removes the excess solder. A solder supplying section 6 consists of a solder dispenser 12 and a controller 13 and

supplies the proper amt. of the required cream solder. A heating section 7 consists of a local heating machine 14 and a controller 15 and melts and solidifies the solder by irradiating the solder with IR rays, etc. Terminals are properly operated by the information indicating the kinds of the solder defects of the control section 9. A positioning mechanism 8 consists of an X-Y stage 16 for supporting a defective circuit board 18 and an NC controller 17 for controlling the operation thereof and positions the points of the solder defects.

Applicants respectfully submit that there is nothing in the above paragraph of Osamu that teaches “non-contact dispensing” as in the presently claimed invention. The above paragraph of Osamu merely discloses that a solder dispenser is used to dispense solder cream.

As the Examiner will note, a translation of the Osamu reference has been provided for the Examiner’s consideration. There is no disclosure in Osamu that teaches “non-contact dispensing” as in the presently claimed invention. There are many types of solder dispensers that are contact dispensing and there is nothing in the Osamu reference to suggest that the solder dispenser is a non-contact dispenser. In view of this, the Osamu reference fails to enable the presently claimed invention and therefore, cannot make up for the deficiencies of Cutting et al.

To the extent the Examiner believes that Osamu inherently discloses non-contact dispensing, the Examiner is reminded that a theory of inherency must be supported by facts and/or technical reasoning that reasonably support a determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *Ex parte Levy* 17 USPQ2d 1461 (BPAI 1990) (emphasis added). Referring to Figure 5 of Osamu, the solder dispenser 12 is illustrated as having dispensed solder 24 on the substrate 18. However, the fact that the drop of solder 24 is separated from the solder dispenser 12 is insufficient to teach non-contact dispensing for several reasons:

1). In Figure 4, the solder dispenser 12 is illustrated as being in contact with the solder 22. Applicants submit that Figure 4 illustrates a point in time where the solder droplet 22 has not yet detached from the solder dispenser 12. Since the solder droplet 22 is in contact with both the substrate and the solder dispenser 12 at the same time, Figure 4 clearly illustrates a “contact” dispenser and not a “non-contact” dispenser as in the presently claimed invention. Consequently, Figure 5 illustrates a “contact” dispenser, except that the nozzle of the solder dispenser 12 has been moved upwardly away from the substrate, so that the solder droplet has separated from the nozzle (but is still in contact with the substrate). *The Examiner has taken the position that Fig. 5 of Osamu illustrates the droplet 24 out of contact with both the dispenser 12 and the substrate 18. However, the droplet 24 is in contact with at least the part 19. Therefore, it is not understood where there is basis for this position. It is also noted that the drawings of Osamu are schematic, and since the disclosure of Osamu does not indicate that the droplet 24 is out of contact with both the dispenser 12 and the substrate 18 (or part 19) at any point in time, the Osamu reference does not inherently, i.e. necessarily disclose this feature.*

2). Referring to Figure 5, the droplet of solder 24 looks exactly like a solder droplet from a “contact” dispenser. The solder droplet 24 is a tear drop shape, which is formed due to contact with the solder dispenser 12 immediately after detaching from the solder dispenser. At such time, the solder droplet would also be in contact with the substrate, so the dispenser would be a “contact” dispenser and not a “non-contact” dispenser as in the presently claimed invention. If the device of Osamu were a “non-contact” dispenser, the solder droplet would be more dome shaped (without the pointed top of the solder droplet in Osamu), because the droplet would be

jetted from the nozzle prior to contacting the substrate. In such case, the pointed top of the droplet would not be formed.

In the Examiner's Advisory Action, the Examiner states “[t]he Examiner disagrees because Fig. 5 or osamu reference shows the cream solder (24) does not contact the substrate (18) and the nozzle (12) at the same time.”

First, the Examiner has not addressed any of the above-mentioned arguments with regard to why the Osamu reference discloses “contact” dispensing.

Second, the attached Declaration explains why one having ordinary skill in the art would understand that Osamu discloses “contact” dispensing. Specifically, the drop shape of the droplet 24 in Osamu is formed by a “contact” dispenser.

In view of the above, since Cutting et al. and Osamu fail to teach each and every recitation in independent claims 1, 19, 20, 39 and 41 of the present invention, Applicants respectfully submit that these references fail to render obvious the independent claims of the present invention for at least this reason. In addition, the Cutting et al. and Osamu references fail to render obvious dependent claims 2-8, 31, 34, 37, 38, 40 and 42-44 at least due to the dependence of these claims on independent claim 1, which is believed to be allowable. Therefore, the Examiner's rejection of claims 1-8, 19, 20, 31, 34, 39, 34 and 37-44 should be withdrawn.

THE “PREDETERMINED” RECITATION:

With regard to the above-mentioned “predetermined” recitation in independent claims 1, 39 and 41, this aspect of the present invention is discussed in the paragraph beginning on page 8,

line 17 of the present application. Specifically, the add-on jetting is “predetermined,” since no inspection is performed after the screen printing to determine, for example, the amount of viscous medium to be added. In the present invention, it is known in advance that solder paste is to be added to every screen printed substrate of a certain kind.

In the references relied on by the Examiner, the additional viscous medium is applied to correct random defects. Therefore, the references relied on by the Examiner fail to disclose this aspect of the present invention as well. For example, Cutting inspects the result “after” reflow and performs touch up as required. Therefore, in Cutting, the touch up is not “predetermined” as in the presently claimed invention. Osamu corrects the solder defects “after” reflow. Again, Osamu does not determine the amount in advance as in the presently claimed invention, but determines the amount to be added “after” inspection. Finally, with regard to Todd et al., this reference is silent with regard to whether the application of adhesive is known in advance. Therefore, this reference fails to anticipate independent claims 1, 39 and 41 of the present invention as well.

In the Examiner’s Office Action, the Examiner states “[t]he references disclose certain amount of viscous medium is add-on jetted on the substrate. Therefore, this certain amount must be determined (set, known in advance) before being added on the substrate.”

As explained in the attached Declaration, none of the references relied on by the Examiner disclose add-on jetting of “predetermined” amounts of viscous medium as described in the specification of the present application. Specifically, paragraph [0030] of the publication of the present application states “The amounts, patterns, heights, type of solder paste, etc., that is

added onto the substrate 1 is predetermined. Thus, there is no inspection [of] the screen printing results performed prior to the jetting of additional solder paste.”

In view of the above amendments and remarks, Applicants respectfully submit that claims 1-8, 19, 20, 31, 34 and 37-44 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the Examiner’s rejections under 35 U.S.C. §§ 102 and 103 are respectfully requested.

CONCLUSION

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

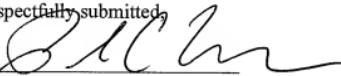
In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis, Registration No. 43,368 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By


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